

## MIRAGE.

Webster, Day county, Dakota: a mirage appeared at sunrise on the 25th, plainly showing the town of Bristol, eleven miles west of Webster.

Mirage was also observed at Traverse City, Michigan, on the 20th, and at Salina, Kansas, on the 31st.

## MISCELLANEOUS PHENOMENA.

## SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and fifty-nine stations show 4,891 observations to have been made, of which five were reported doubtful; of the remainder, 4,886, there were 3,995, or 81.8 per cent., followed by the expected weather.

## SUN SPOTS.

Professor David P. Todd, director of the Lawrence Observatory, Amherst, Massachusetts, furnishes the following record of sun spots for July, 1884:

Date— July, 1884.	No. of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total No. visible.		Remarks.
	Gr's	Spots	Gr's	Spots	Gr's	Spots	Gr's	Spots	
4, 11 a. m.	3	42†					7	85†	Many of the spots small.
6, 3 p. m.	0	0	1	15†	0	0	0	50†	
7, 4 p. m.	1	3	1	10†	1	3	6	45†	
9, 4 p. m.	0	10†	2	20†			4	23†	
10, 5 p. m.	1	3	2	2	0	3	3	20†	
13, 4 p. m.	0	10†	0	0	0	0	3	30†	
14, 5 p. m.	0	5†	0	3	0	0	3	35†	
15, 4 p. m.	0	5†	1	1	0	0	2	40†	
16, 6 p. m.	1	2	0	5†	1	2	3	30†	
17, 11 a. m.	0	0	0	5†	0	0	2	30†	
19, 11 a. m.	1	2	0	15†	1	2	3	4	
20, 5 p. m.	1	3	1	1	1	3	3	12	
21, 5 p. m.	1	3	0	0	1	2	4	20†	
22, 12 m.	0	5†	0	0	0	0	4	25†	
23, 4 p. m.	0	5†	0	0	0	0	3	30†	
27, 5 p. m.							3	30†	
30, 9 a. m.							3	25†	

Facula were seen at the time of every observation. †Approximated.

Sycamore, New York: on the 21st several sun spots were observed, two of which were large and black.

## DROUGHT.

Fort Davis, Texas: the "water-holes" in this part of the state are rapidly drying up. The grass is badly scorched and cattle are suffering in consequence of poor pasturage.

Reports from Cantonment, Indian Territory, on the 14th, stated that the corn crop in that region was suffering for rain.

Galveston, Texas, 14th: reports from San Antonio state that the sheep and cattle raising interests in the western part of Texas, are suffering from the effect of the prolonged drought. The streams on the American side of the Rio Grande river are reported to be dry.

Dodge City, Kansas, 17th: drought has caused injury to the crops in this part of the state.

Wauseon, Fulton county, Ohio: for thirty-two days preceding July 23d, only 0.26 inch of rain fell; much inconvenience resulted from scarcity of water.

Wausau, Marathon county, Wisconsin: from the 4th to 22d the weather was unusually dry; small streams dried up, and the water in the Wisconsin river reached a very low stage; vegetation suffered from lack of rain; a heavy fall of rain occurred on the 22d.

Thornville, Lapeer county, Michigan: from the beginning of the month until the 23d, the weather was very dry; after the 23d the rains were plentiful.

The following extracts are from the Pittsburg "Daily Post" of July 26, 1884.

CINCINNATI, Ohio, July 24.—Up to the first day of July the season in the Ohio valley, within a radius of two hundred miles from Cincinnati, was highly favorable for all the crops. There were frequent rains and the temperature was in every way such as to promote the growth of the crops. Since that date there has been no general rain in this region, and the local showers have been limited to small areas and have been infrequent and insufficient.

All through southern Ohio and Indiana and northern Kentucky the wagon roads are covered with dust. Wheat is all harvested and the most of it has been threshed. The dry weather has been favorable for harvesting and threshing. Early sown oats have escaped injury, but the late sown are suffering. Hay, which the rains of the spring months and of June set so thick on the ground, has had its growth checked by the July drought. Corn is the greatest sufferer of all the grains. In a few fields of low, irrigated bottom lands the corn looks vigorous and thrifty, but everywhere else, in upland and lowland, the outlook is already discouraging and is growing more so every day. Corn, in lands that usually yield from forty-five to seventy-five bushels per acre, is now not more than three or four feet high and in full tassel. Should seasonable weather set in and continue from this time forward, such corn might yield three-fourths of the average crop. On the other hand, if the present drought should continue eight or ten days longer no change of season for the better afterward could save the crop. One-half of it would scarcely be worth cutting for fodder, and the other half would average not more than a third of the usual yield. Most of the few showers that have fallen since the first of this month have been within a few miles of the Ohio river, as was that of yesterday. Further north, in Ohio and Indiana, and further south, in Kentucky, the drought has been unmitigated. Potatoes and garden stuff have been seriously checked in their growth. To aggravate the situation, the common meadow grasshoppers have increased in a few small areas in the most seriously parched regions, where they have invaded gardens and vineyards and cut down everything before them. The large streams have shrunk to rivulets and the brooks and marshy lands are drying up, endangering the existence of live stock. Sparks from locomotives fire the dead grass along the railways. A good rain, spreading over a wide stretch of country, within three or four days, would be worth millions of dollars to this part of the Ohio valley, and the continuance of good, seasonable weather until the 1st of September, would be worth millions of dollars more.

CINCINNATI, Ohio, July 25.—Rain fell at Indianapolis and in the belt eastward through central Ohio as far as Wheeling last night, but none fell here and in southern Ohio. A report from Youngstown says the drought has caused considerable loss to farmers. Those along the railroads watch night and day to prevent fire. A Germantown, Butler county, special says that region is scourged with the severest drought for years. The tobacco crop is very much injured and corn threatened. The crops of wheat, oats, and hay are unusually fine.

Lancaster, Fairfield county, Ohio: during the night of the 24-25th an abundant rain fell here, which was the first precipitation of any consequence that had occurred since the 4th. The corn, which had been looking well, began to shrivel up and many farmers were apprehensive that the quality would be inferior. The rainfall above-mentioned has placed the crop beyond danger, and an unprecedented yield is now promised.

Wapakoneta, Anglaise county, Ohio: prior to the abundant rains of the 25th the crops, especially the corn and potatoes, in this county suffered from drought.

Springfield, Clark county, Ohio: the long-continued and damaging drought which prevailed in this county was terminated by a heavy rainfall on the 25th.

Mount Gilead, Morrow county, Ohio: all kinds of crops, especially corn, suffered serious injury from the protracted drought which prevailed up to the 24th. Rain began to fall at 3 p. m. of that date and continued during almost the entire night and was of great benefit to farming interests.

Montgomery, Alabama: reports on the 26th from various localities adjacent to this place stated that the cotton crop was suffering serious injury from drought.

Toledo, Ohio, 31st: although the crops in this part of the state were injured by the extremely dry weather during the early part of the month, they were revived by subsequent rains, and at the close of the month were in promising condition.

Edgington, Rock Island county, Illinois: the rains of July in this county were light and of local character; in some localities the crops are suffering from drought.

Fort Madison, Lee county, Iowa: the month was very dry in this locality; only 1.41 inches of rain fell at Fort Madison.

Syracuse, New York, 31st: the weather during the month was very dry in this part of the state, and corn has suffered seriously in consequence.

## METEORS.

Bordentown, Burlington county, New Jersey: at 8.20 p. m. of the 3d a meteor apparently rose from beneath the horizon and slowly passed from north-northeast towards the north-northwest, in a direct line over from 50° to 60°, at an altitude

of about  $40^\circ$ , being in view from five to ten seconds. It appeared to be about one-third the size of the moon, the forward portion of the body being a fiery red, the center a reddish purple verging to blue at the rear, with a tail of bright blue nearly  $20^\circ$  in length, tapering to a sharp point at the end farthest from the body.

A meteor, evidently the same as that above described, was observed at various points in Canada, western New York, New England, and the middle Atlantic states, as will be seen from the following reports:

Cazenovia, Madison county, New York: At 8.25 p. m. of the 3d, a brilliant meteor passed from above the pole star to the western horizon, leaving a trail that remained visible for several minutes.

Reports from Oswego state that the above meteor was seen by many persons at that place.

State College, Centre county, Pennsylvania: a brilliant meteor was observed on the evening of the 3d; it resembled a rocket in appearance and disappeared in the northwestern sky.

Palermo, Oswego county, New York: an unusually bright meteor was observed passing to the westward at 8.30 p. m. on the 3d; it left a trail which remained visible for several minutes.

North Volney, Oswego county, New York: a very large and brilliant meteor, passing in a westerly direction, was observed on the evening of the 3d.

Bethel, Fairfield county, Connecticut: at 8.25 p. m. of the 3d a meteor of remarkable brilliancy was seen in the northern sky; it appeared to pass almost horizontally from east to west, leaving a bright trail,  $30^\circ$  of which were visible at the same moment. Before disappearing, the course of the meteor was more inclined toward the horizon, and it disappeared behind some intervening trees. When first observed its altitude was about  $45^\circ$  and when last observed about  $15^\circ$ . The phenomenon was one of the most remarkable of its kind ever witnessed by the observer.

Fort Myer, Virginia: a brilliant meteor was seen in the northern sky at 8.25 p. m. of the 3d; it was visible five seconds and moved in a westerly direction, producing a bright light.

The following extract is from the Canadian Weather Review for July, 1884:

A magnificent meteor was seen on the night of the 3d at 8.27 p. m., standard time, passing from southeast to northwest—colors brilliant red and green. Two distinct explosions are reported to have been heard. After the first explosion a sinuous streak remained visible until covered by clouds; the time of flight was from seven to eight seconds, and the apparent size about one-fourth that of the moon. Reports have been received from Listowel, Hastings, Beatrice, Belleville, Lakefield, Pembroke, Peterborough, Kingston, Deseronto, Lindsay, and Huntingdon, all substantially agreeing as to course, size, &c. It passed two or three miles south of Belleville, and about the same distance north of Lindsay.

Pittsburg, Pennsylvania: a very bright meteor was observed at 2.48 a. m. of the 20th; it moved from the zenith towards the northern horizon, leaving a reddish cloud which floated northward. Another bright meteor, passing across the sky from east to west, was seen at 8.50 p. m. of the 30th.

The following extract is taken from the "Manhattan (Kansas) Republic" of July 18th:

A Kansas City, Missouri, special from Saint Mary's says: A remarkable meteorite fell last Friday night, the 11th, in the grounds of the Saint Mary's college, near this city. The professor has secured the fragments, and finds them to contain metals which make this one of the most precious in the world; only three others of this kind are certainly known to have fallen on this planet, one at Agram, in Europe, in 1751; another in Dickson county, Tennessee, in 1835, and a third at Brennan, Texas, in 1847.

Sacramento, California: a bright meteor was seen at 9.10 p. m. of the 21st, passing northward in the constellation of the "Great Bear."

Anna, Union county, Illinois: two brilliant meteors passing from northeast to southwest, were observed at 9.40 p. m. of the 23d; one of them was especially bright, and illuminated the surrounding country, the light being sufficiently strong to cast shadows.

Fort Macon, North Carolina: a very bright meteor was observed passing across the sky from east to west at 11.30 p. m. of the 24th.

Meteors were also observed at the following places:

Oswego, New York, 3d.

Ardenia, New York, 3d, 30th.

Prescott, Arizona, 4th.

Prairie du Chien, Wisconsin, 5th.

Davenport, Iowa, 10th, 12th, 23d, 24th, 26th, 27th.

Stateburg, South Carolina, 13th, 14th, 15th, 16th, 21st, 22d; one or more conspicuous meteors were observed on every clear evening after the 12th.

Variety Mills, Virginia, 19th, 20th.

Scott's Hill, North Carolina, 21st.

Chapel Hill, North Carolina, 22d.

Woodstock, Maryland, 23d, 27th, 29th.

Red Willow, Nebraska, 24th.

Allison, Kansas, 28th, 29th, 30th.

Burlington, Iowa, 30th.

Launcester, Wisconsin, 31st.

#### WATER SPOUTS.

Toledo, Ohio: the steamer "Evening Star" reports having observed a water-spout on Lake Erie between 7 and 8 p. m. of the 30th, when near Toledo. There was but little wind and a calm sea at that time, but a severe hail squall occurred about ten minutes before the water-spout was observed. The water-spout consisted of a huge column inclined at an angle of  $80^\circ$  or  $90^\circ$ ; it was about one mile distant from the steamer when observed, and was moving in an easterly direction.

The following extract is taken from the "Saint Louis Globe-Democrat" of July 26, 1884:

The storm late yesterday afternoon showed many of the characteristics, in its coming, of the approach of a tornado. The clouds seemed to approach from the southeast and also from the southwest, but the greatest force was from the former direction. At 4.30 the sky was filled with clouds, but beneath them there appeared a separate installment of lighter colored clouds assuming all kinds of fantastic shapes. They moved to a centre north and west of the city, where they seemed to lose energy, as the agitation and fantastic motion apparently decreased. Passengers on the ferryboats about 5 o'clock, when the rain had begun to fall, saw the most interesting manifestation of the storm. The water opposite the foot of Anna street became violently agitated, and while spectators were wondering what caused the disturbance, a cloud, shaped like an inverted cone, moved over it, and the water rose in a cone to meet it, but as the two cones came together the oblique lines of the two sides became nearly vertical. It was a water-spout, and its movement was very rapid in a northeasterly direction. Opposite the foot of Choteau avenue the spout left the river near the Pittsburg dike, and added to its bulk a large amount of sand from the shore. It passed over the Pittsburg Transfer Stables, the east end of which was torn from its foundation and thrown through the engine house. The roof of the engine house was taken off and many pieces were carried to the Little Rolling Mills, a mile away. Here the column lost its force and power of motion. It was precipitated in a torrent of rain, which covered the streets. An eye-witness reports that it appeared to be about five hundred feet in diameter and had a rapid rotary motion, producing a sound like distant thunder. For a few seconds the air seemed to be motionless, when suddenly the column swept across toward the Pittsburg engine house and stables, damaging them as described above.

#### A TIDAL WAVE.

MILWAUKEE, WISCONSIN, July 24, 1884.—A tidal wave was felt to-day in the Menomonee and Milwaukee rivers. It was most noticeable at the "Straight Cut," as the entrance to the river is called, where the waters receded three feet, returning again in about fifteen minutes. Above the dam in the Milwaukee river, from two to three miles from the "Straight Cut," swimmers who were standing in shallow water were completely submerged by the returning waters.

#### EARTHQUAKES.

San Francisco, California: a slight earthquake shock is reported to have been felt at about day-light on the 15th, the vibration being from east to west.

The following extract is from "Nature," of July 24, 1884:

During the night of July 19th an earthquake was felt at Agram. It lasted four seconds, and was accompanied by subterranean rumblings. No damage was done.

The following extracts are from "The New York Herald" of July 24th and 26th, respectively:

LONDON, ENGLAND, July 23, 1884.—A very perceptible shock of earth-

quake occurred to-day on the island of Ischia, in the Mediterranean sea. The inhabitants were greatly agitated as they feared an explosion from the long extinct volcano, Mount San Nicolo.

CAIRO, EGYPT, July 25, 1884.—It is reported that an earthquake has occurred at Massowah, on the Red sea. Nearly all the houses in the city were destroyed, and the ships in the harbor were violently rocked. The inhabitants were panic stricken and fled to the interior.

#### POLAR BANDS.

Lead Hill, Arkansas, 14th, 31st.  
Los Angeles, California, 27th.  
Archer, Florida, 2d, 3d, 6th, 12th, 13th, 17th, 20th, 23d, 24th, 27th, 28th.  
Laconia, Indiana, 29th.  
Wabash, Indiana, 7th, 16th.  
Salina, Kansas, 24th.  
Maud, Kansas, 21st.  
Gardiner, Maine, 7th.  
Escanaba, Michigan, 30th.  
Mountainville, New York, 12th, 15th.  
Wauseon, Ohio, 1st, 2d, 28th.  
Leetsdale, Pennsylvania, 10th.  
Wytheville, Virginia, 6th, 12th, 15th, 22d.  
Variety Mills, Virginia, 3d, 14th.

#### PRAIRIE AND FOREST FIRES.

Kingston, Ontario: extensive fires were burning in several of the adjacent townships on the 2d. The largest of these fires covered an area three miles wide and about twenty miles long. One million feet of lumber were burned. The country was so dry that the fires spread with great rapidity.

Forest fires also occurred in the vicinity of Carson City, Nevada, on the 6th, and in the vicinity of Fort Buford, Dakota, on the 27th.

#### ZODIACAL LIGHT.

Archer, Florida, 18th, 22d, 23d.  
Cantonment, Indian Territory, 10th.  
Indianapolis, Indiana, 22d.  
Fall River, Massachusetts, 15th.  
Escanaba, Michigan, 16th.  
Nashville, Tennessee, 20th to 24th.

#### SAND STORMS.

Fort McDowell, Arizona, 7th, 8th.  
Yuma, Arizona, 15th.  
West Las Animas, Colorado, 1st.  
Boisé City, Idaho, 28th.

#### MIGRATION OF BIRDS.

*Geese flying northward.*—Cape Henry, Virginia, 19th.  
*Ducks flying southward.*—Portland, Oregon, 23d.

#### NOTES AND EXTRACTS.

REPORT OF THE ALABAMA WEATHER SERVICE, UNDER DIRECTION OF PROFESSOR P. H. MELL, JR.

MECHANICAL AND AGRICULTURAL COLLEGE,  
AUBURN, ALABAMA, August 1, 1884.

Although there have been oppressive and sultry days the month of July has sustained quite a uniform temperature, and the nights have generally been cool and comfortable. The heat in some sections, however, has been keenly felt, because the atmosphere was so saturated with moisture as to prevent rapid evaporation from the body. The thermometer ranged as high as 100° at only four stations.

The state has been visited by copious showers and in some sections the rains have been unusually heavy. The farming interests, however, have suffered but little, and the prospects for a fine crop are very flattering.

#### State summary.

Mean temperature, 80°·5; highest temperature, 104° at Troy, on the 25th; lowest temperature, 54° at Selma, on the 8th; range of temperature for the state, 50°; greatest monthly ranges at stations, 35° at Troy and 41° at Calera; least monthly range of temperature, 14° at Lafayette and 25° at Auburn; greatest daily ranges at stations, 38° at Calera, 35° at Selma on the 8th, and 27° at Gadsden on the 21st; least daily ranges, 0° at Union Springs on the 10th, 0° at Florence on the 15th, 0° at Carrollton on the 28th, and 9° at Mobile on the 23d.

Mean depth of rainfall, 5.47 inches; mean daily rainfall, 0.186 inch; largest monthly rainfall, 12.02 at Green Springs; least monthly rainfall, 0.41 at Fort Deposit; greatest daily average for the state, 1.10 inches, on the

28th; largest daily rainfall at stations, 3.50 inches at Carrollton, 3.10 at Scottsborough, and 3.50 inches at Wetumpka, all on the 28th.

Days of general rainfall, 14th, 15th, 25th to 29th; average number of days on which rain fell, 11, average number of cloudy days, 10.3; fair days, 13.5; clear days, 7.2.

Warmest day, 5th; coolest day, 8th.

Prevailing winds, west and northwest; greatest force of wind reported from Marion on the 13th—45 miles per hour from the west; Mobile reports on the 6th, 23 miles per hour from the southeast.

The following meteorological summary is taken from the report of Hon. J. T. Henderson, Commissioner of Agriculture, for the state of Georgia:

Districts.	Temperature.			Precipitation.
	Mean of maximum.	Mean of minimum.	Monthly mean.	
Northern Georgia.....	94.5	58.3	77.2	4.59
Middle Georgia.....	95.7	64.0	80.4	3.34
Southwestern Georgia.....	94.0	72.0	83.0	6.25
Southeastern Georgia.....	91.8	69.5	80.2	2.72
Eastern Georgia.....	95.5	64.5	82.2	3.31
Means for state.....	94.3	65.7	81.2	4.04

The following meteorological summary is from the July report of the "Illinois Weather Service," under direction of Mr. S. D. Fisher:

Districts.	Temperature.			Precipitation.	Average number of rainy days.
	Mean of maximum.	Mean of minimum.	Monthly mean.		
Northern counties.....	89.8	54.1	71.1	5.97	11
Central counties.....	92.1	59.2	73.5	3.62	12
Southern counties.....	95.0	64.3	76.8	3.97	10
Averages for state.....	92.3	59.2	73.8	4.52	11

The following meteorological summary is taken from the July report of the "Indiana Weather Service: "

Districts.	Temperature.			Precipitation.
	Mean of maximum.	Mean of minimum.	Monthly mean.	
Northern counties.....	90.0	56.7	73.6	3.68
Central counties.....	90.2	57.3	74.4	4.99
Southern counties.....	92.1	58.6	74.6	4.74
Averages for state.....	90.8	57.5	73.6	4.57

#### IOWA WEATHER BULLETIN, FOR JULY, 1884.

July, 1884, was fair, cool and calm, with moderate excess of rainfall.

The mean temperature was two degrees below normal; during the past forty-five years, the July temperature has been as much, or more, below normal in sixteen years. The first and second decades were decidedly cold, being three and four and a half degrees below normal; but the third decade was hot, being one and a half degrees above normal. The 17th was the coldest day, being 11° below normal; the 23d was the hottest day with 10° above normal. The black bulb sun thermometer averaged 48°·4 above the air temperature at noon, and reached 154° on the 23d.

The mean cloudiness was nearly normal, but the number of clear days was high.

The number of thunderstorms was high, and several were quite severe, locally accompanied with high wind or hail. The most extended of these was the squall of the afternoon and evening of the 11th, extending from Palo Alto to Johnson counties, and considerable damage was done in a narrow belt from Hamilton county southeast, by hail. The thunderstorm of the evening of the 23d and early morn of the 24th was most severe from Dallas to Marion counties. The thunderstorm of the evening of the 4th was most severe in middle eastern Iowa. Three very small tornadoes reached the ground over a short distance in Sioux City, Woodbury county; near Denison, Crawford county, and near Hubbard, Hardin county. This brings the latest summer date of tornadoes in Iowa two days further; but the damage done to life and property by these tornadoes was less than what lightning and hail did during the same storm in other parts of Iowa.

For the state at large, the weather has been favorable. No continued rains having occurred, haying has been interfered with but little, and har-